MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

SUPPLEMENTARY EXAMINATION

TRIMESTER 1, 2015/2016

EEL1166 – CIRCUIT THEORY

(All sections / Groups)

17 NOV 2015
9.00 AM – 11.00 AM
(2 HOURS)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 6 pages with 4 Questions only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

Question 1

(a) Using the Superposition Principle, determine the voltage, v_0 in the circuit given in Figure Q1(a).

[11 marks]

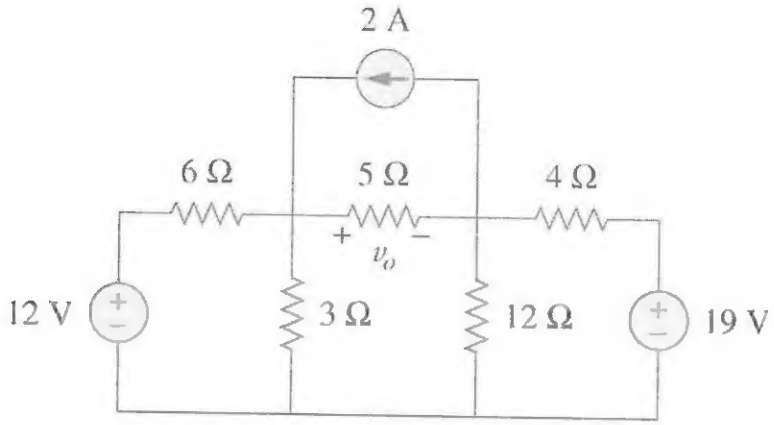

Figure Q1(a)

(b) Using Norton's Theorem, determine the voltage, V_0 in the circuit given in Figure Q1(b).

[14 marks]

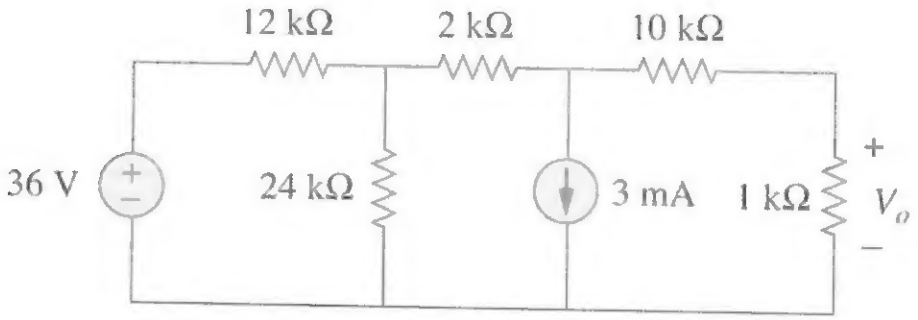

Figure Q1(b).

Continued.....

Question 2

(a) Define 'Periodic' and 'Aperiodic' signals. Give an example for each.

[3 marks]

(b) For the waveform shown in Figure Q2(b),

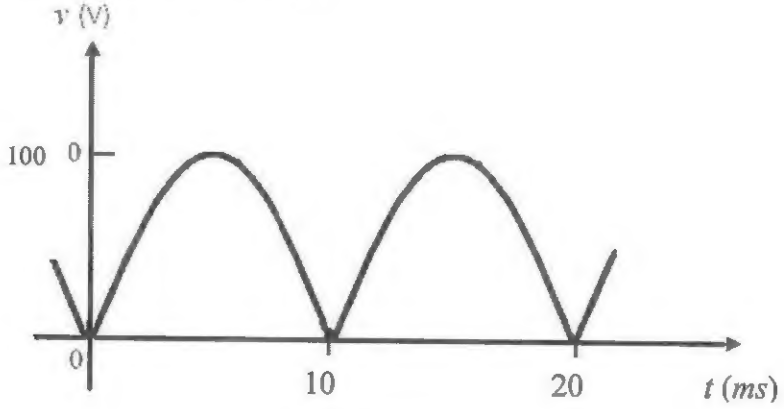

Figure Q2(b)

(i) calculate the fundamental cyclic frequency, and

[1 mark]

(ii) find the average value of the waveform.

[5 marks]

(c) Use the node-voltage method to find the branch currents i_1, i_2 and i_3 in the circuit of Figure Q2(c). Show that the power developed in the circuit is equal to the power dissipated.

[16 marks]

Continued.....

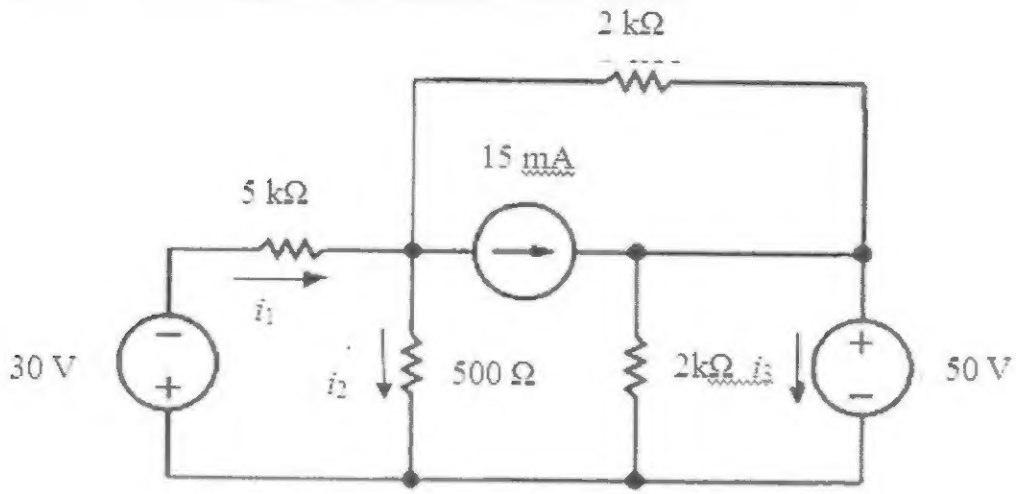

Figure Q2(c)

Question 3

(a) A linear bilateral circuit is shown in Figure Q3(a). Determine the following:

(i) total impedance , Z_T, and [5 marks]

(ii) total current, I. [2 marks]

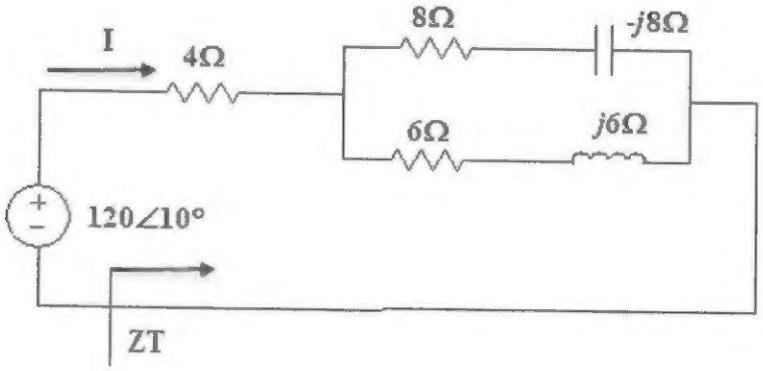

Figure Q3(a)

Continued.....

(b) The parallel *RLC* circuit is shown in Figure Q3(b). Determine the following:

(i) total admittance of the circuit and express the result in polar as well as in rectangular form and also draw admittance diagram,

[4 marks]

(ii) total impedance of the circuit in polar form, and

[2 marks]

(iii) total *rms* current of the circuit.

[2 marks]

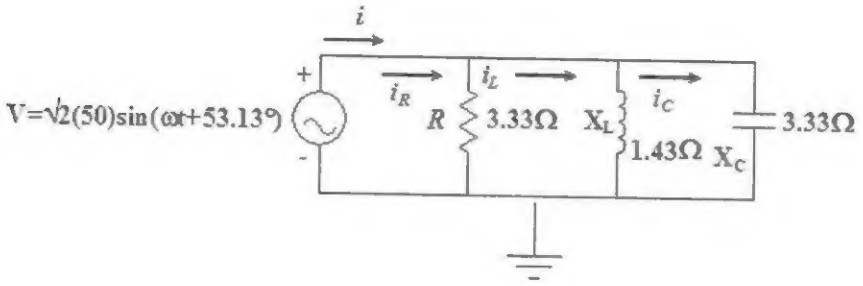

Figure Q3(b)

(c) A series sinusoidal Steady state *RLC* circuit is shown in Figure Q3(c). Given values are $R = 20\ \Omega$, $L = 5$ mH and $C = 3$ pF. Determine bandwidth, BW.

[10 marks]

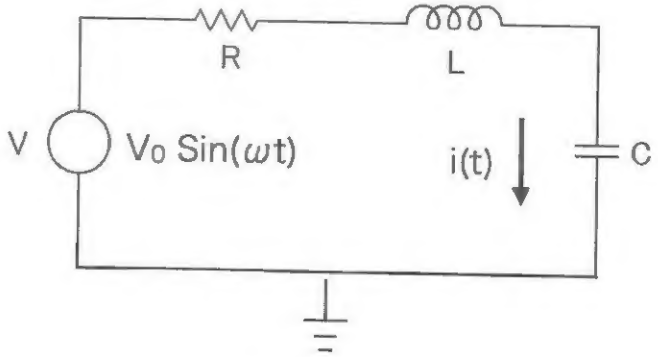

Figure Q3(c)

Continued.....

Question 4

(a) Determine the capacitor voltage $v(t)$ for $t > 0$ in the circuit of Figure Q4(a). Assume that the switch was open for a long time.

[9 marks]

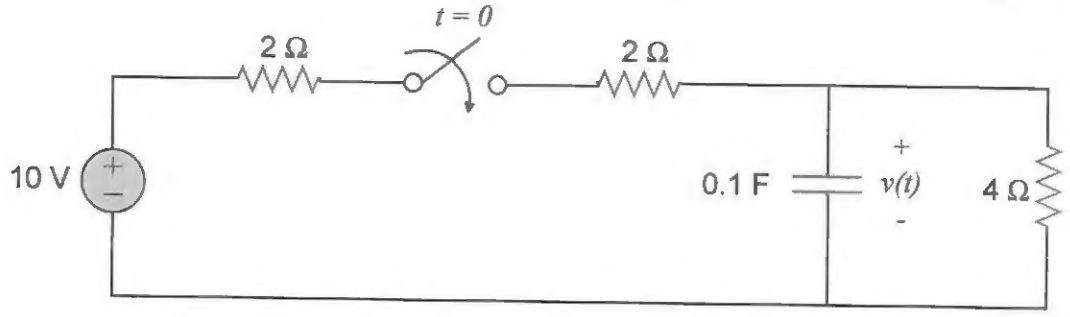

Figure Q4(a)

(b) The switch in the circuit of Figure Q4(b) has been at position a for a long time. At $t = 0$, it moves to position b. Find $v(t)$ for $t > 0$ in the circuit of Figure Q4(b).

[16 marks]

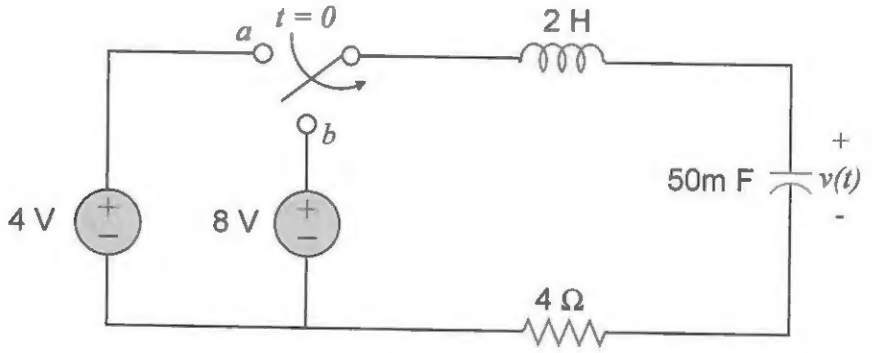

Figure Q4(b)

End of paper